

CLAIMS

1. An isolated HBV polynucleic acid or a fragment thereof, said polynucleic acid or said fragment characterized in that it comprises codon 204 of the HBV reverse transcriptase domain wherein said codon 204 is encoding a serine.
2. The HBV polynucleic acid or fragment thereof according to claim 1, said polynucleic acid or fragment further characterized in that it comprises codon 180 of the HBV reverse transcriptase domain wherein said codon 180 is encoding a methionine.
3. The HBV polynucleic acid or fragment thereof according to claims 1 or 2 which is defined by SEQ ID NO:6 or the complement thereof, or said fragment according to claims 1 or 2 which is derived from SEQ ID NO:6 or the complement thereof.
4. An isolated HBV DNA polymerase/reverse transcriptase protein or a fragment thereof, said protein or fragment characterized in that it comprises amino acid 204 of the HBV reverse transcriptase domain and wherein said amino acid 204 is a serine.
5. The HBV DNA polymerase/reverse transcriptase protein or fragment thereof according to claim 4 characterized further in that it comprises amino acid 180 of the HBV reverse transcriptase domain and wherein said amino acid 180 is a methionine.
6. The HBV DNA polymerase/reverse transcriptase protein or fragment thereof according to claims 4 or 5 which is encoded by the isolated HBV polynucleic acid or fragment thereof according to any of claims 1 to 3.
7. The HBV DNA polymerase/reverse transcriptase protein or fragment thereof according to any of claims 4 to 6 which is defined by SEQ ID NO:4, or said fragment according to any of claims 4 to 6 which is derived from SEQ ID NO:4.
8. An isolated HBV variant comprising a polynucleic acid or fragment thereof according to any of claims 1 to 3.

9. An isolated HBV variant comprising a protein or fragment thereof according to any of claims 4 to 7.

10. A vector comprising the HBV polynucleic acid or fragment thereof according to any of claims 1 to 3.

11. A host cell comprising the HBV polynucleic acid or fragment thereof according to any of claims 1 to 3, the HBV variant according to claim 8 or the vector according to claim 10.

12. A host cell comprising the HBV DNA polymerase/reverse transcriptase protein or fragment thereof according to any of claims 4 to 7 or the HBV variant according to claim 9.

13. A method for detecting the presence of a HBV in a biological sample, said method comprising the step of detecting the presence of a HBV polynucleic acid or fragment thereof according to any of claims 1 to 3.

14. The method according to claim 13 comprising:

- (i) obtaining a target HBV polynucleic acid from said biological sample wherein said target HBV polynucleic acid is suspected to comprise a serine-encoding codon 204 of the HBV reverse transcriptase domain or to comprise a methionine-encoding codon 180 and a serine-encoding codon 204 of the HBV reverse transcriptase domain;
- (ii) obtaining the nucleic acid sequence of the target HBV polynucleic acid of (i);
- (iii) inferring, from the nucleic acid sequence obtained in (ii), the presence of said serine-encoding codon 204 of the HBV reverse transcriptase domain or of said methionine-encoding codon 180 and said serine-encoding codon 204 of the HBV reverse transcriptase domain and, therefrom, the presence of said HBV in said biological sample.

15. The method according to claims 13 comprising:

- (i) obtaining a target HBV polynucleic acid from said biological sample wherein said target HBV polynucleic acid is suspected to comprise a serine-encoding codon 204 of the HBV reverse transcriptase domain or to comprise a methionine-encoding

codon 180 and a serine-encoding codon 204 of the HBV reverse transcriptase domain;

(ii) contacting the target HBV polynucleic acid of (i) with an oligonucleotide capable of discriminating a codon 204 encoding a serine from a codon 204 encoding a methionine, valine or isoleucine or with an oligonucleotide capable of discriminating a codon 180 encoding a methionine from a codon 180 encoding a leucine and an oligonucleotide capable of discriminating a codon 204 encoding a serine from a codon 204 encoding a methionine, valine or isoleucine;

(iii) inferring, from the discriminatory signal obtained in (ii), the presence of said serine-encoding codon 204 of the HBV reverse transcriptase or of said methionine-encoding codon 180 and said serine-encoding codon 204 of the HBV reverse transcriptase domain and, therefrom, the presence of said HBV in said biological sample.

16. The method according to claim 15 wherein said discriminating in (ii) is based on hybridization and wherein said discriminatory signal in (iii) is a hybridization signal.

17. A method for detecting resistance to an antiviral drug of a HBV virus present in a biological sample, said method comprising the step of detecting the presence of a HBV polynucleic acid or fragment thereof according to any of claims 1 to 3.

18. The method according to claim 17 comprising:

(i) obtaining a target HBV polynucleic acid from said biological sample wherein said target HBV polynucleic acid is suspected to comprise a serine-encoding codon 204 of the HBV reverse transcriptase domain or to comprise a methionine-encoding codon 180 and a serine-encoding codon 204 of the HBV reverse transcriptase domain;

(ii) obtaining the nucleic acid sequence of the target HBV polynucleic acid of (i);

(iii) inferring, from the nucleic acid sequence obtained in (ii), the presence of said serine-encoding codon 204 in the HBV reverse transcriptase domain or of said methionine-encoding codon 180 and said serine-encoding codon 204 in the HBV reverse transcriptase domain and, therefrom, said resistance to an antiviral drug of a HBV virus present in said biological sample.

19. The method according to claim 17 comprising:

- (i) obtaining a target HBV polynucleic acid from said biological sample wherein said target HBV polynucleic acid is suspected to comprise a serine-encoding codon 204 of the HBV reverse transcriptase domain or to comprise a methionine-encoding codon 180 and a serine-encoding codon 204 of the HBV reverse transcriptase domain;
- (ii) contacting the target HBV polynucleic acid of (i) with an oligonucleotide capable of discriminating a codon 204 encoding a serine from a codon 204 encoding a methionine, valine or isoleucine or with an oligonucleotide capable of discriminating a codon 180 encoding a methionine from a codon 180 encoding a leucine and an oligonucleotide capable of discriminating a codon 204 encoding a serine from a codon 204 encoding a methionine, valine or isoleucine;
- (iii) inferring, from the discriminatory signal obtained in (ii), the presence of said serine-encoding codon 204 in the HBV reverse transcriptase domain or of said methionine-encoding codon 180 and said serine-encoding codon 204 in the HBV reverse transcriptase domain and, therefrom, said resistance to an antiviral drug of a HBV virus present in said biological sample.

20. The method according to claim 19 wherein said discriminating in (ii) is based on hybridization and wherein said discriminatory signal in (iii) is a hybridization signal.

21. A diagnostic kit for detecting the presence of a HBV in a biological sample, said kit comprising a means for detecting the presence of a HBV polynucleic acid or fragment thereof according to any of claims 1 to 3.

22. The diagnostic kit according to claim 21 comprising:

- (i) optionally, a means for obtaining the nucleic acid sequence of a target HBV polynucleic acid suspected to comprise a serine-encoding codon 204 of the HBV reverse transcriptase domain or to comprise a methionine-encoding codon 180 and a serine-encoding codon 204 of the HBV reverse transcriptase domain;
- (ii) a means for inferring, from the nucleic acid sequence obtained in (i), the presence of said serine-encoding codon 204 of the HBV reverse transcriptase domain or of said methionine-encoding codon 180 and said serine-encoding codon 204 of the

HBV reverse transcriptase domain and, therefrom, the presence in said biological sample of said HBV.

23. The diagnostic kit according to claim 21 comprising an oligonucleotide capable of discriminating, in said HBV polynucleic acid, a codon 204 encoding a serine from a codon 204 encoding a methionine, valine or isoleucine.

24. The diagnostic kit according to claim 23 further comprising an oligonucleotide capable of discriminating, in said HBV polynucleic acid, a codon 180 encoding a methionine from a codon 180 encoding a leucine.

25. A diagnostic kit for detecting resistance to an antiviral drug of a HBV virus present in a biological sample, said kit comprising a means for detecting the presence of a HBV polynucleic acid or fragment thereof according to any of claims 1 to 3.

26. The diagnostic kit according to claim 25 comprising:

- (i) optionally, a means for obtaining the nucleic acid sequence of the target HBV polynucleic acid suspected to comprise a serine-encoding codon 204 of the HBV reverse transcriptase domain or to comprise a methionine-encoding codon 180 and a serine-encoding codon 204 of the HBV reverse transcriptase domain;
- (ii) a means for inferring, from the nucleic acid sequence obtained in (i), the presence of said serine-encoding codon 204 in the HBV reverse transcriptase domain or of said methionine-encoding codon 180 and said serine-encoding codon 204 in the HBV reverse transcriptase domain and, therefrom, resistance to an antiviral drug of a HBV virus present in said biological sample.

27. The diagnostic kit according to claim 25 comprising an oligonucleotide capable of discriminating, in said HBV polynucleic acid, a codon 204 encoding a serine from a codon 204 encoding a methionine, valine or isoleucine.

28. The diagnostic kit according to claim 27 further comprising an oligonucleotide capable of discriminating, in said HBV polynucleic acid, a codon 180 encoding a methionine from a codon 180 encoding a leucine.

29. The diagnostic kit according to any of claims 23, 24, 27 or 28 further comprising a means for detecting the discriminatory signal obtained by contacting said HBV polynucleic acid and said oligonucleotide or oligonucleotides.

5 30. The diagnostic kit according to any of claims 23, 24, 27 or 28 wherein said oligonucleotide or oligonucleotides are attached or immobilized to a solid support.

31. A method for detecting resistance to an antiviral drug of a HBV virus present in a biological sample, said method comprising the step of detecting the presence of a HBV
10 DNA polymerase/reverse transcript protein or fragment thereof according to any of claims 4 to 7.

32. A method for screening for drugs active against a HBV virus comprising a polynucleic acid according to any of claims 1 to 3 or comprising a protein according to any of claims 4
15 to 7, said method comprising:

- (i) measuring replication of said HBV virus in the absence of said drug;
- (ii) measuring replication of said HBV virus in the presence of said drug;
- (iii) inferring from (i) and (ii) the inhibitory effect of said drug on replication of said HBV virus.

20 33. The method according to claim 32 further comprising performing steps (i), (ii) and (iii) with a wild-type HBV virus and comparing the inhibitory effect of said drug on replication of said wild-type HBV virus with the inhibitory effect of said drug on replication of the HBV virus comprising a polynucleic acid according to any of claims 1
25 to 3 or comprising a DNA polymerase/reverse transcriptase protein according to any of claims 4 to 7.

34. A method for screening for drugs active against a HBV virus comprising a polynucleic acid according to any of claims 1 to 3 or comprising a protein according to any of claims 4
30 to 7, said method comprising:

- (i) measuring a DNA polymerase/reverse transcriptase activity of said HBV virus in the absence of said drug;
- (ii) measuring the same DNA polymerase/reverse transcriptase activity as in (i) of said HBV virus in the presence of said drug;

(iii) inferring from (i) and (ii) the inhibitory effect of said drug on said DNA polymerase/reverse transcriptase activity of said HBV virus.

5 35. The method according to claim 34 further comprising performing steps (i), (ii) and (iii) with a wild-type HBV virus and comparing the inhibitory effect of said drug on said DNA polymerase/reverse transcriptase activity of said wild-type HBV virus with the inhibitory effect of said drug on said DNA polymerase/reverse transcriptase activity of the HBV virus comprising a polynucleic acid according to any of claims 1 to 3 or comprising a DNA polymerase/reverse transcriptase protein according to any of claims 4 to 7.

10 36. The use of a method according to any of claims 13 to 20 or 31 or of a diagnostic kit according to any of claims 21 to 30 for monitoring progression of HBV infection, for monitoring the occurrence of resistance to an antiviral drug, or for adapting a therapeutic regimen due to the occurrence of antiviral drug resistance.

15 37. An oligonucleotide capable of discriminating, in a HBV polynucleic acid or fragment thereof according to any of claims 1 to 3, a codon 204 encoding a serine from a codon 204 encoding a methionine, valine or isoleucine in the HBV reverse transcriptase domain.